CDP-C231

SERVICE MANUAL

US Model
Canadian Model
Mexican Model

- The CDP-C231 is similar to the earlier CDP-C221 (US model).
  Refer to the CDP-C221 SERVICE MANUAL for information not contained in this service manual
- This set is the CD player section in SEN-231.

PARTS LIST(The difference between CDP-C221 and CDP-231)

page	CDP-C221		CDP-C231	
	Ref.No.	Part.No.	Part.No.	Description
19	1	A-4660-027-A	A-4660-256-A	PANEL ASSY, FRONT
21	120	* 4-944-632-31	* 4-944-632-62	PANEL, BACK

NOTE :

● Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

COMPACT DISC PLAYER

SONY®

Sony Corporation
Audio Group

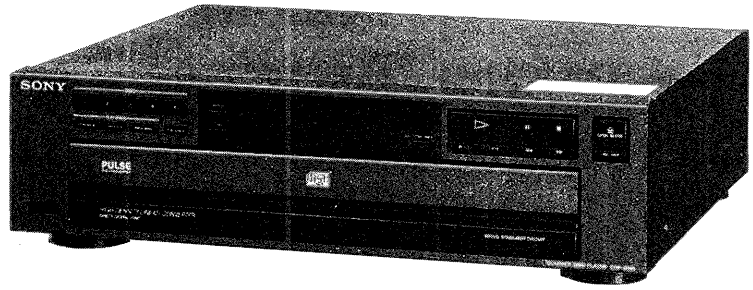
English
93E09039-1
Printed in Japan
© 1993.5
Published by Audio Sector Quality Assurance Dept.

9-957-674-12

CDP-C221

SERVICE MANUAL

US Model
Canadian Model
Mexican Model



This set is the
CD player section in
SEN–221CD

COMPACT disc DIGITAL AUDIO

Model Name Using Similar Mechanism	CDP-C312M
Optical Pick-up Block Type	BU-5BD3/M

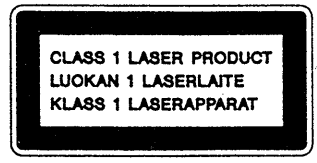
SPECIFICATIONS

System	Compact disc digital audio system
Laser	Semiconductor laser (λ = 780 nm) Emission duration: continuous
Laser output	Max. 44.6 μW* * This output is the value measured at a distance of about 200 mm from the objective lens surface on the Optical Pick-up Block.
Frequency response	2 Hz – 20 kHz (±0.5 dB)
Harmonic distortion	Less than 0.01 % (1 kHz)
Signal to noise ratio	More than 100 dB
Dynamic range	More than 98 dB
Dimensions	Approx. 430 x 125 x 385 mm (w/h/d) (17 x 5 x 15 1/4 inches)
Weight	Approx. 5.1 kg (11 lb 4 oz) net

Design and specifications subject to change without notice.

For the CD player

This Compact Disc player is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT label is located on the rear exterior.



Laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

THIS APPARATUS COMPLIES WITH THE CLASS B LIMITS FOR RADIO NOISE EMISSIONS SET OUT IN RADIO INTERFERENCE REGULATIONS.

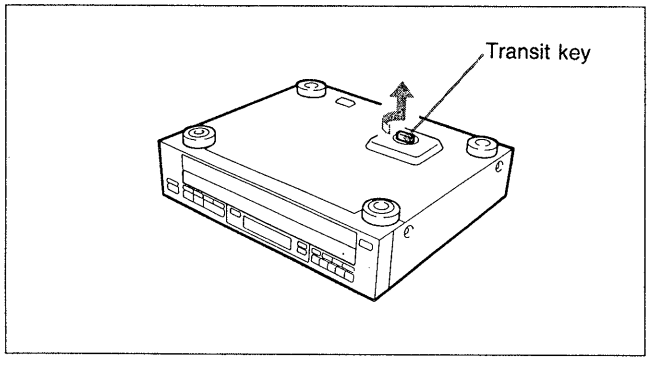
COMPACT DISK PLAYER

SONY®

Note on the Transit Key

The transit key on the bottom exterior of the unit protects the optical system against shock during transportation. Before operating the CD player, be sure to remove the key by following the instructions on the label, and store it in a safe place.

When transporting the unit, replace the key in its original hole and lock it in place.



NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.

During repair, pay attention to electrostatic breakdown and also use the procedure in the printed matter which is included in the repair parts.

The flexible board is easily damaged and should be handled with care.

NOTES ON LASER DIODE EMISSION CHECK

The laser beam on this model is concentrated so as to be focused on the disc reflective surface by the objective lens in the optical pick-up block. Therefore, when checking the laser diode emission, observe from more than 30cm away from the objective lens.

PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs a laser. Therefore, be sure to follow carefully the instructions below when servicing.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

1. Laser Diode Properties
   - Material: GaAlAs
   - Wavelength: 780 nm
   - Emission Duration: continuous
   - Laser Output: max. 44.6 μW*

     * This output is the value measured at a distance of about 200 mm from the objective lens surface on the Optical Pick-up Block.

2. During service, do not take the Optical Pick-up Block apart, and do not adjust the APC circuit. If there is a breakdown in the APC circuit (including laser diode), replace the entire Optiocal Pick-up Block (including APC borad).

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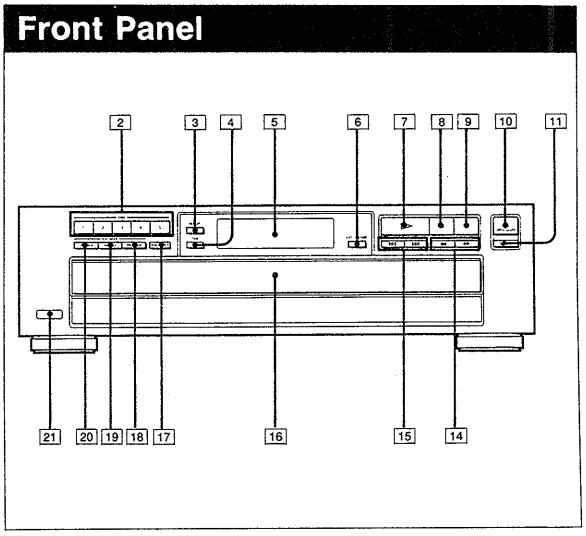
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SECTION 1
GENERAL

1-1. LOCATION OF CONTROLS

Front Panel

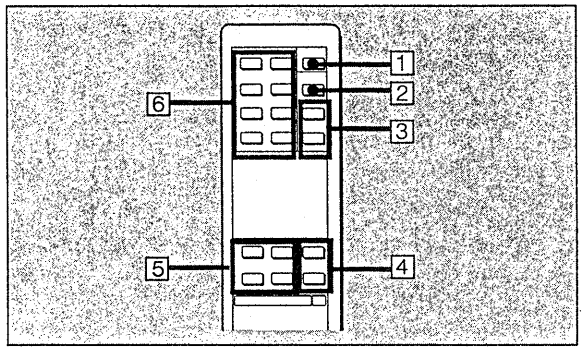


2 Disc 1-5 buttons
3 REPEAT button
4 TIME button
5 Display window
6 EDIT/TIME FADE button
7 ► (play) button
8 ❚❚ (pause) button
9 ■ (stop) button
10 ⏏ OPEN/CLOSE button
11 DISC SKIP button
14 ◄◄/►► (manual search) buttons
15 ⏮/⏭ (AMS*) buttons
16 Disc tray
17 PEAK SEARCH button
18 PROGRAM button
19 SHUFFLE button
20 CONTINUE button
21 Remote sensor

* AMS is the abbreviation of Automatic Music Sensor.

Remote Commander

The remote commander supplied with this unit can control the unit from a distance. The remote commander is divided into 6 sections according to the functions as shown below.



1 **POWER button**

2 **DBFB button** (This button does not operate.)

3 **TUNER PRESET +/– buttons**

4 **VOL (volume) +/– buttons**

5 **Function selectors**

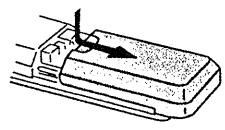
6 **CD player operation buttons**
In the TUNER mode:
Press CD ► once, the unit enters the CD mode.
Press CD ► twice, the CD player starts playback.
In the mode other than the TUNER mode:
Press CD ► once, the unit enters the CD mode and starts playback.

Battery life
About half a year of normal operation can be expected when using the Sony SUM-3 (NS) batteries. When the batteries are exhausted, the remote commander can no longer operate the unit. If this happens, replace both batteries with new ones.

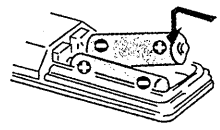
To avoid battery leakage
When the commander is not be used for a long time, remove the batteries to avoid damage caused by battery leakage and corrosion.

Inserting the batteries into the remote commander

1 Open the cover.

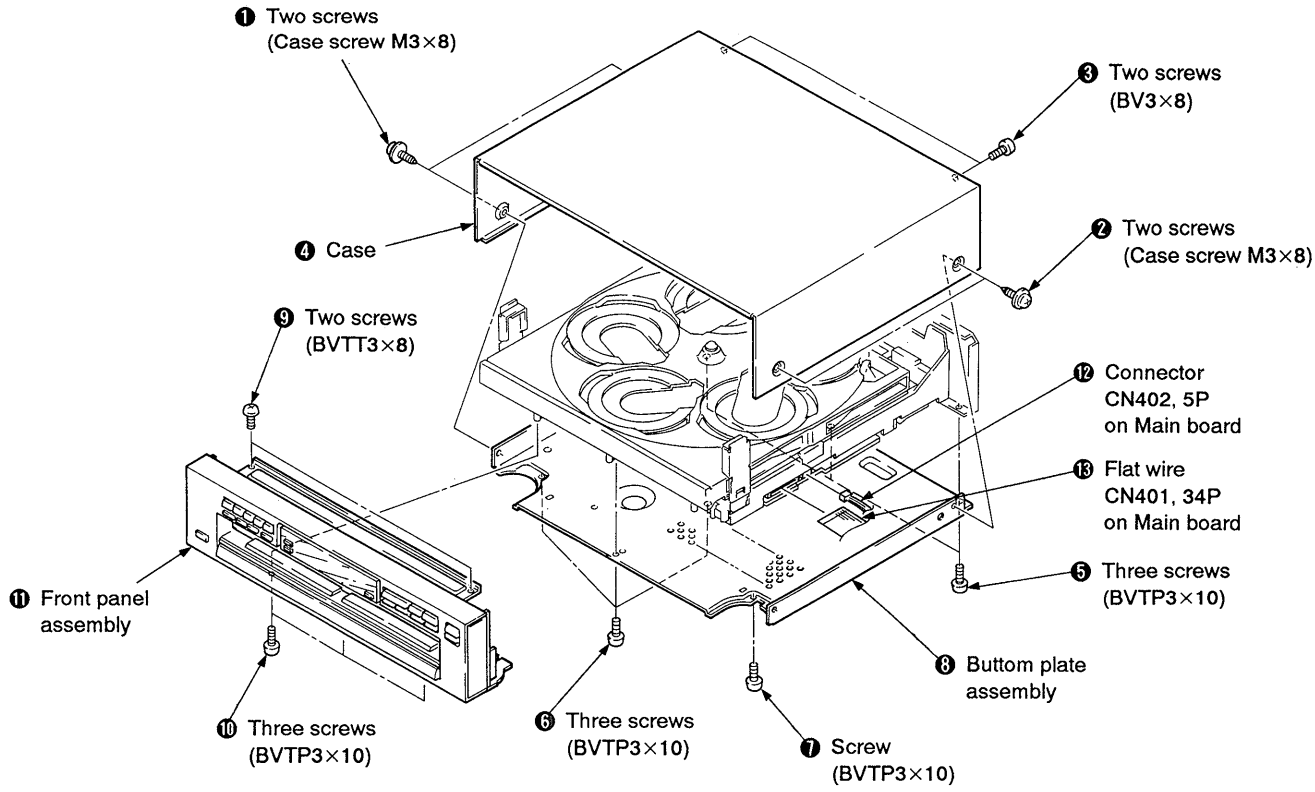


2 Insert two size-AA (R6) batteries with correct polarity.

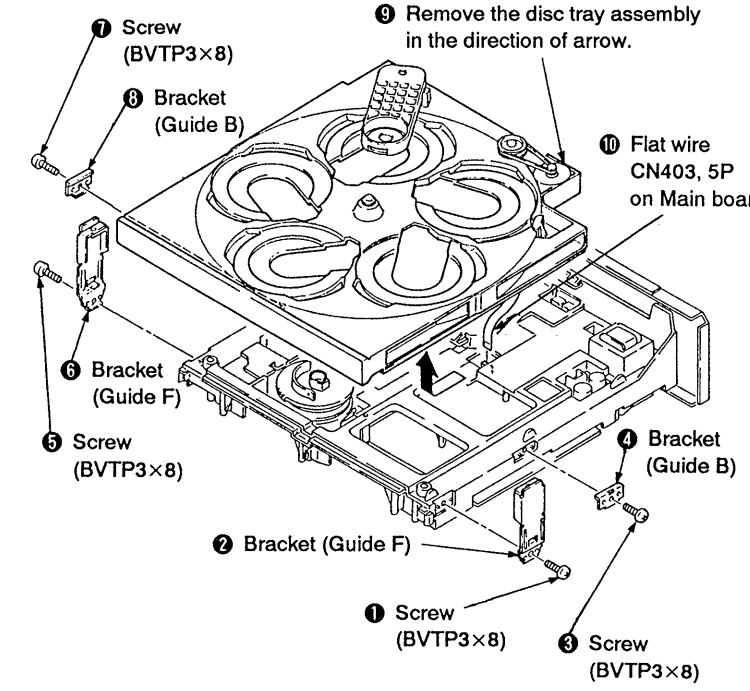


SECTION 2
DISASSEMBLY

2-1. REMOVAL OF FRONT PANEL AND CASE ASSEMBLIES

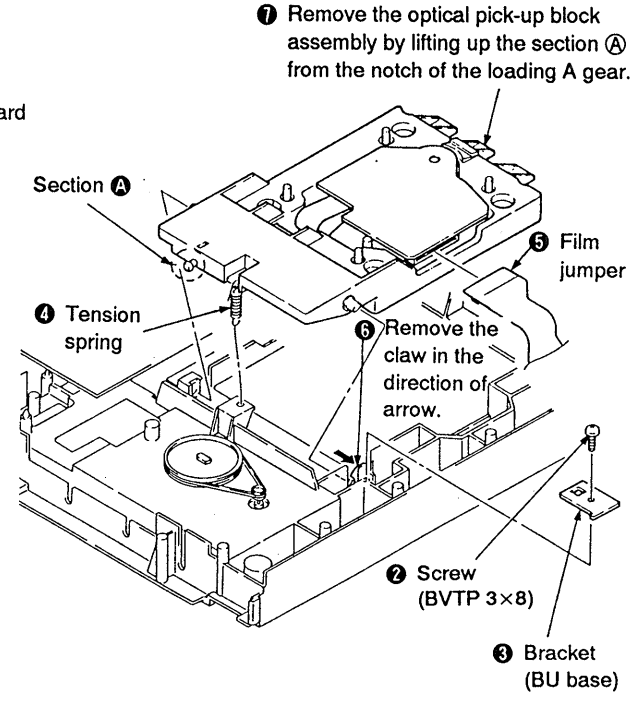

❶ Two screws (Case screw M3×8)
❸ Two screws (BV3×8)
❹ Case
❷ Two screws (Case screw M3×8)
❾ Two screws (BVTT3×8)
⓬ Connector CN402, 5P on Main board
⓭ Flat wire CN401, 34P on Main board
❺ Three screws (BVTP3×10)
⓫ Front panel assembly
❽ Buttom plate assembly
⓾ Three screws (BVTP3×10)
❻ Three screws (BVTP3×10)
❼ Screw (BVTP3×10)

2-2. REMOVAL OF DISC TRAY ASSEMBLY


❼ Screw (BVTP3×8)
❾ Remove the disc tray assembly in the direction of arrow.
❽ Bracket (Guide B)
❿ Flat wire CN403, 5P on Main board
❻ Bracket (Guide F)
❺ Screw (BVTP3×8)
❹ Bracket (Guide B)
❷ Bracket (Guide F)
❶ Screw (BVTP3×8)
❸ Screw (BVTP3×8)

2-3. REMOVAL OF OPTICAL PICK-UP BLOCK ASSEMBLY

❶ Replace the set up side down.

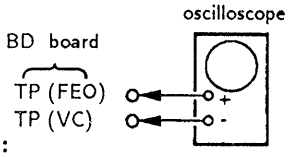

❼ Remove the optical pick-up block assembly by lifting up the section Ⓐ from the notch of the loading A gear.
Section Ⓐ
❺ Film jumper
❹ Tension spring
❻ Remove the claw in the direction of arrow.
❷ Screw (BVTP 3×8)
❸ Bracket (BU base)

SECTION 3
ELECTRICAL BLOCK CHECKING

Note :

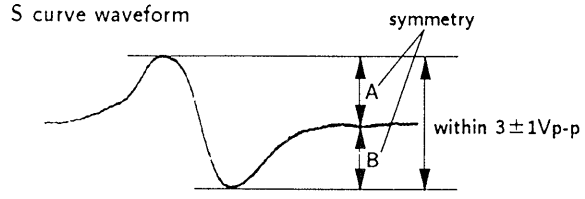
1. CD Block basically constructed to operate without adjustment. Therefore, check each item in order given.
2. Use YEDS-18 disc (3-702-101-01) unless otherwise indicated.
3. Use the oscilloscope with more than 10MΩ impedance.
4. Clean an object lens by an applicator with neutral detergent when the signal level is low than specified value with the following checks.

S Curve Check



Procedure :

1. Connect oscilloscope to test point TP (FEO) on BD board.
2. Connect between test point TP (FES) and TP (VC) by lead wire.
3. Turned Power switch on and actuate the focus serch. (actuate the focus serch when disc table is moving in and out.)
4. Check the oscilloscope waveform (S curve) is symmetrical between A and B. And confirm peak to peak level within 3±1Vp-p.

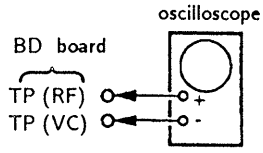


5. After check, remove the lead wire connected in step 2.

Note : • Try to mesure several times to make sure that the ratio of A : B or B : A is more than 10 : 7.

• Take sweep time as long as possible and light up the brightness to obtain best waveform.

RF Level Check

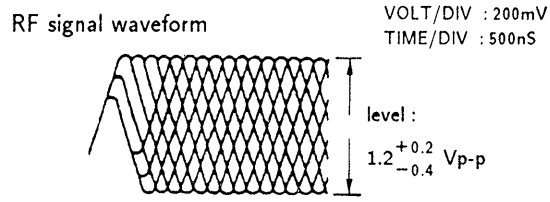


Procedure :

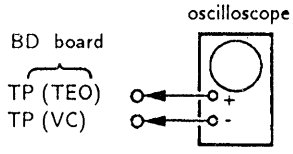
1. Connect oscilloscope to test point TP (RF) on BD board.
2. Turn Power switch on.
3. Put disc (YEDS-18) in and playback.
4. Confirm that oscilloscope waveform is clear and check RF signal level is correct or not.

Note :

Clear RF signal waveform means that the shape "◇" can be clearly distinguished at the center of the waveform.

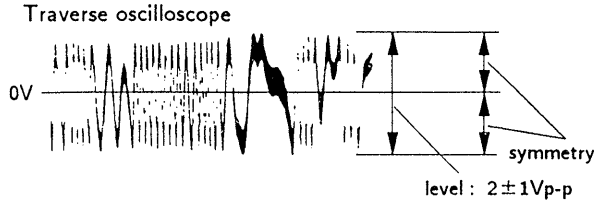


E-F Balance Check



Procedure :

1. Connect test point TP (ADJ) to ground and TP (TES) to TP (VC) with lead wire.
2. Connect oscilloscope to test point TP (TEO) on BD board.
3. Turn Power switch on.
4. Put disc (YEDS-18) in and playback.
5. Confirm that the osilloscope waveform is symmetrical on the top and bottom in relation to 0V, and check this level.

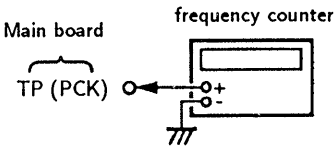


6. Remove the lead wire connected in step 1.

RF PLL Free-run Frequency Check

Procedure :

1. Connect frequency counter to test point (PCK) with lead wire.



2. Turn Power switch on.
3. Confirm that reading on frequency counter is 4. 3218MHz.

Focus/Tracking Gain

This gain has a margin, so even if it is slightly off. There is no problem.

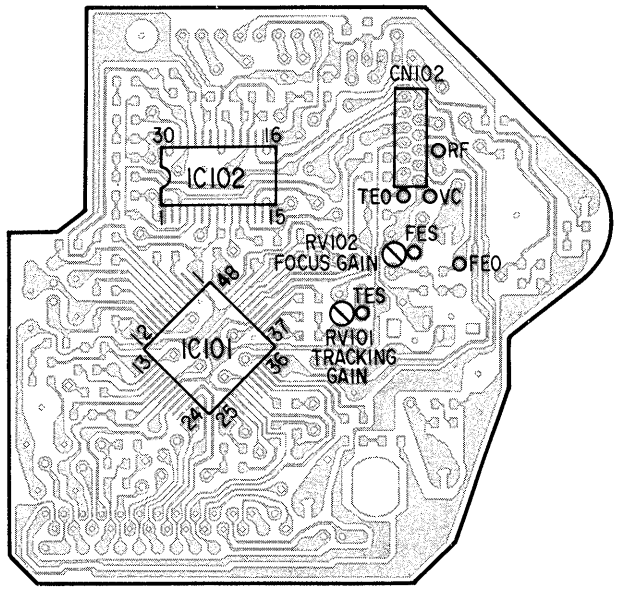
Therefore, do not perform, this adjustment.

Please note that it should be fixed to mechanical center position when you moved and do not know original position.

Adjustment Locations :

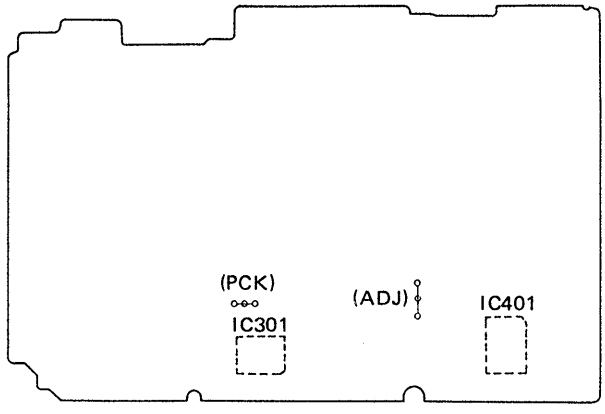
[BD board]

— conductor side —



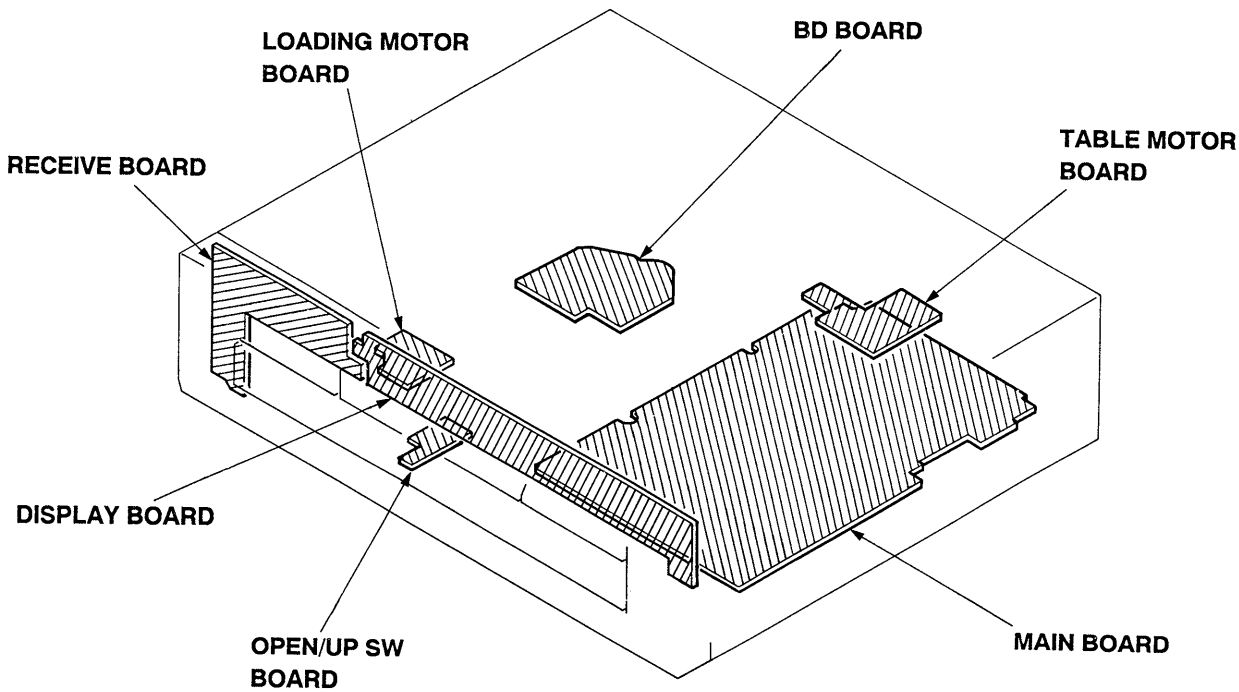
[Main board]

— component side —



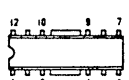
SECTION 4
DIAGRAMS

4-1. CIRCUIT BOARDS LOCATION

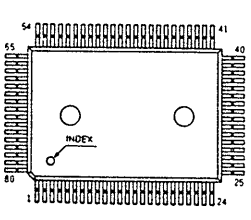


4-2. SEMICONDUCTOR LEAD LAYOUTS

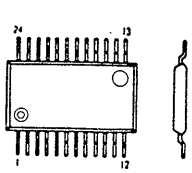
CXA1291P



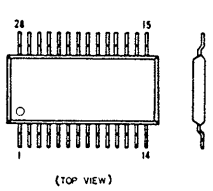
CXD2500AQ
CXP50116-279Q



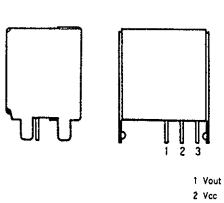
CXD2560M



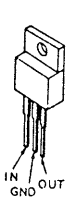
CXD2561M



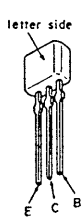
GP1U52XB



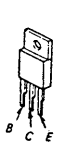
M5F7807L



2SA2785-HFE

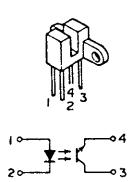


2SB1094-LK

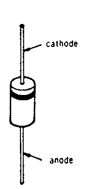


2SC3623A-LK
DTA144ES
DTC114ES
DTC144ES

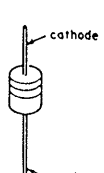
GP-1A521



1N4148M

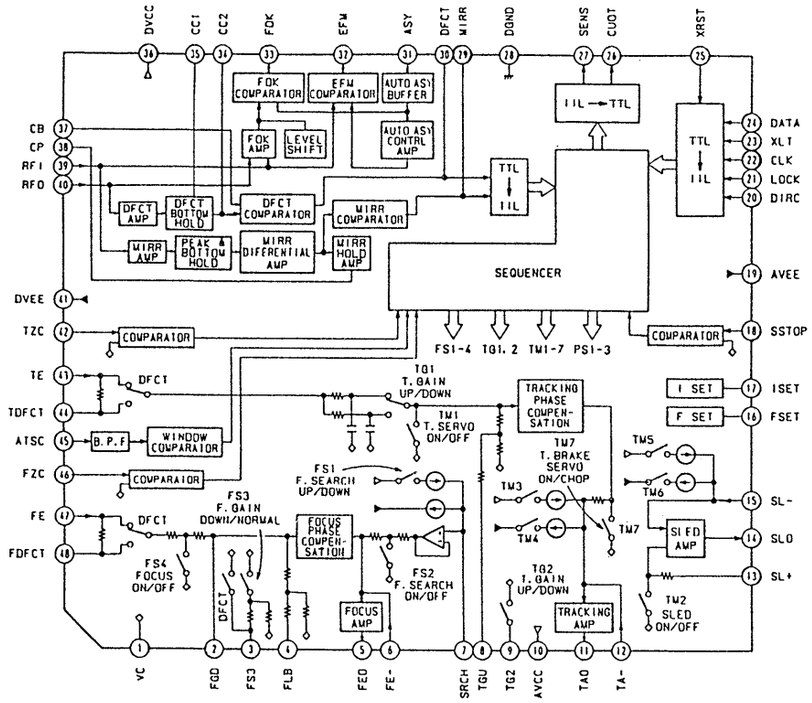


RD5.6ES-B2

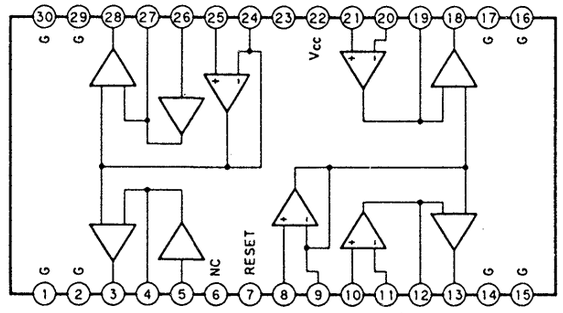


4-3. IC BLOCK DIAGRAMS

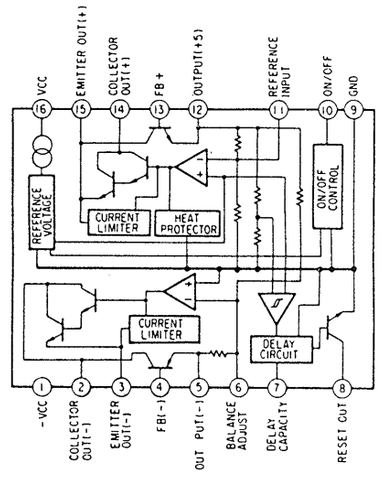
IC101 CXA1372Q



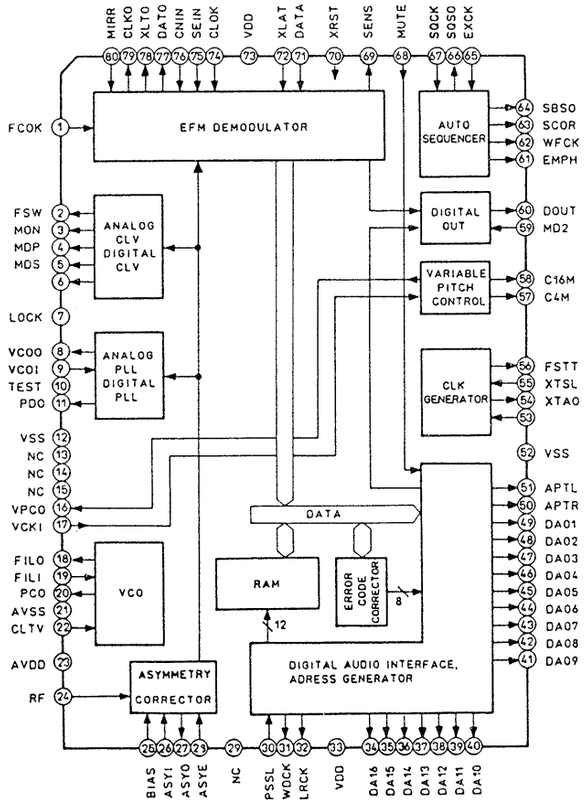
IC102 LA6532M



IC202 M5290P-16



IC301 CXD2500Q



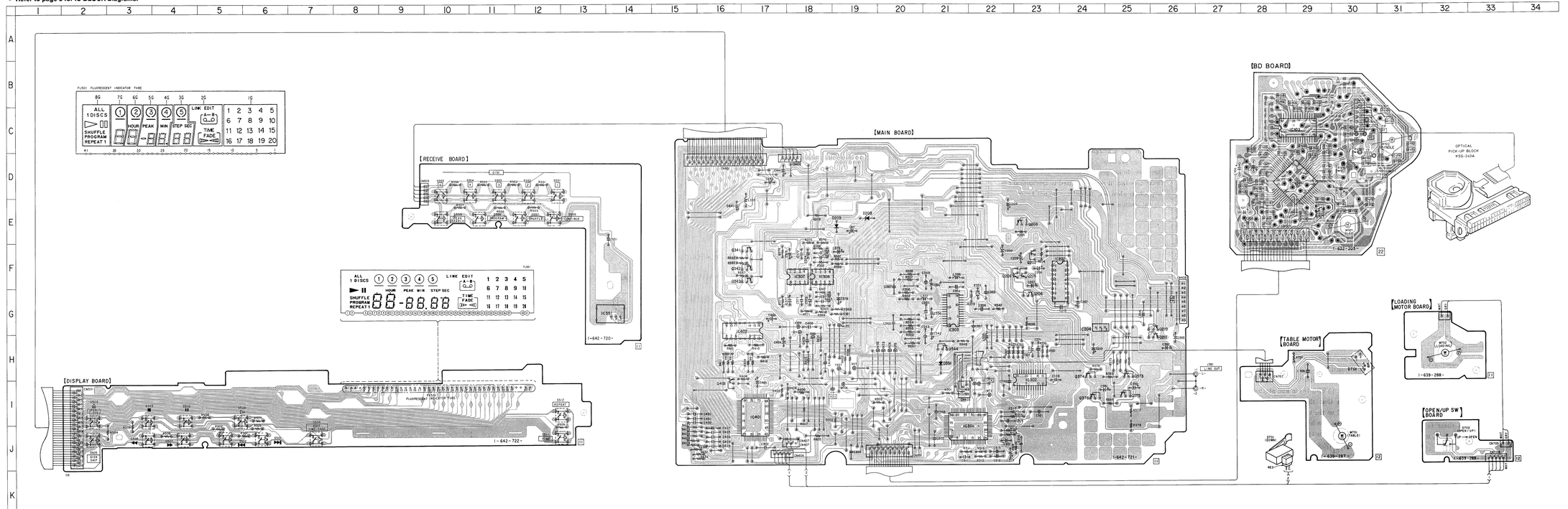
4-4. PRINTED WIRING BOARDS

• Refer to page 8 for IC BLOCK Diagrams.

• Semiconductor Location

Ref. No.	Location
D208	E-19
D209	E-19
D351	H-21
D701	H-30
IC101	D-29
IC102	C-29
IC202	F-23
IC204	G-24
IC301	J-21
IC302	I-23
IC303	G-21
IC306	F-18
IC307	F-18
IC401	I-17
IC402	G-16
IC551	G-14
Q101	E-29
Q202	F-23
Q203	E-23
Q204	G-23
Q205	F-23
Q206	F-23
Q210	G-26
Q211	H-26
Q341	F-16
Q342	F-16
Q343	F-16
Q344	H-21
Q373	F-17
Q374	F-17
Q375	F-17
Q376	F-17
Q401	I-16

Note:
- ○——: parts extracted from the component side.
- ●: Through hole.
- : Pattern on the side which is seen.
- : Pattern of the rear side.



4-5. SCHEMATIC DIAGRAM

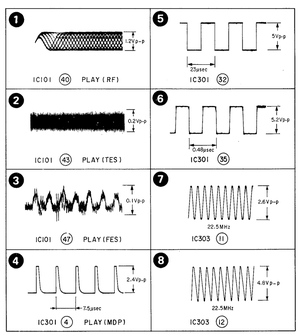
• Refer to page 7 for Semiconductor Lead Layout.

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.

Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- ▭▭ : B+ Line
- ▭▭ : B– Line
- ▭ : adjustment for repair.
- Voltage and waveforms are dc with respect to ground under no-signal (detuned) conditions.
- Voltages are taken with a VOM (Input Impedance 10MΩ) Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⇨ : CD

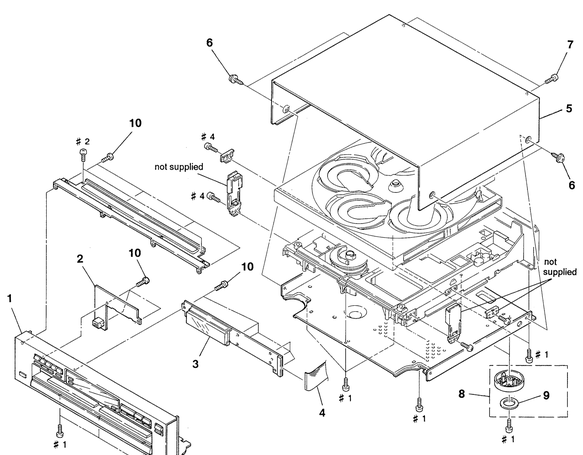


SECTION 5
EXPLODED VIEWS

NOTE:
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ Parts color ↑ Cabinet's color
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.
- Canadian model is abbreviated as CND, and also Mexican model is MX.

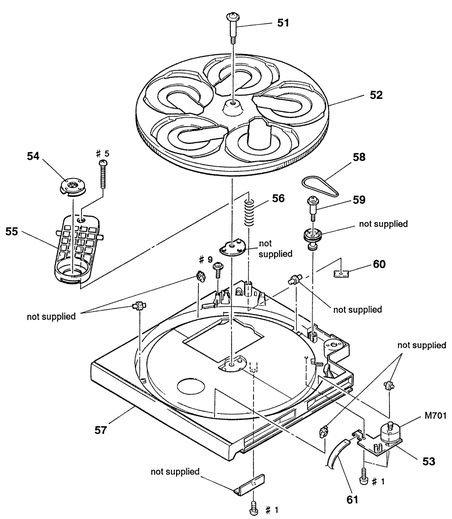
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1. FRONT PANEL AND CASE ASSEMBLIES



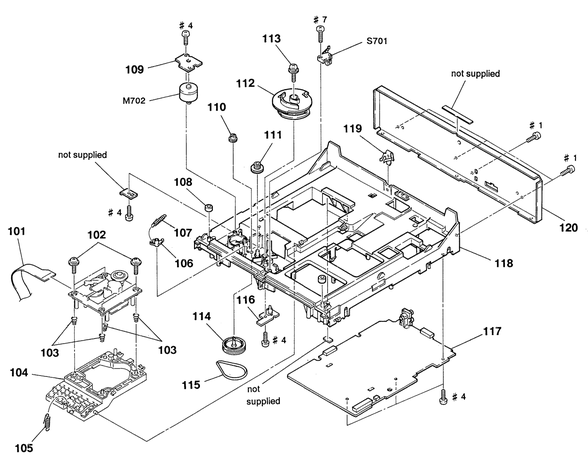
Ref.No.	Part No.	Description	Remark
1	A-4660-027-A	PANEL ASSY, FRONT (US) (Mexican)	
1	A-4660-028-A	PANEL ASSY, FRONT (Canadian)	
* 2	1-642-720-11	RECEIVE BOARD	
* 3	A-4649-175-A	DISPLAY BOARD, COMPLETE	
4	1-590-835-11	WIRE, FLAT TYPE (34 CORE)	
* 5	4-944-153-01	CASE	
6	3-363-099-01	SCREW (CASE) (M3X8)	
7	3-703-865-21	SCREW (+BV 3X8)	
8	X-4942-199-1	FOOT ASSY	
9	4-923-836-11	CUSHION	
10	4-928-635-01	SCREW, +BV (2.6X8) TAPPING	

5-2. DISC TRAY ASSEMBLY



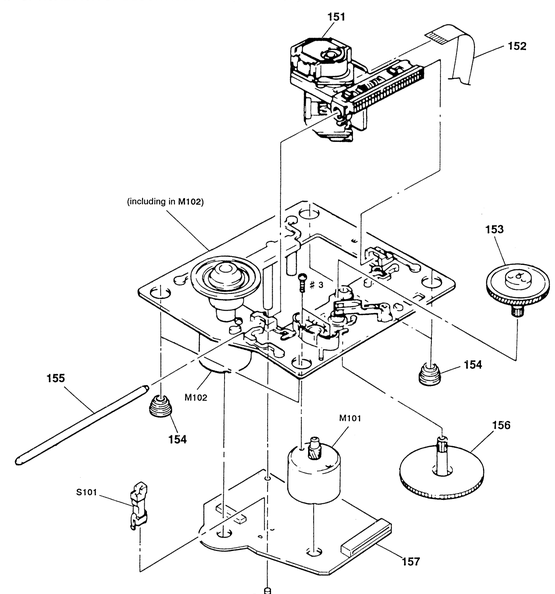
Ref.No.	Part No.	Description	Remark
51	4-926-384-01	SCREW, STEP	
* 52	4-926-383-21	TABLE (B), DISK	
* 53	1-638-729-11	TABLE MOTOR BOARD	
* 54	1-452-538-11	MAGNET	
* 55	4-930-506-02	BRACKET (PRESS PULLEY)	
56	4-926-395-01	SPRING, COMPRESSION	
* 57	4-944-160-11	TABLE (A), DISC (Canadian)	
* 57	4-944-160-41	TABLE (A), DISC (US) (Mexican)	
58	4-926-359-01	BELT	
59	4-923-597-01	SCREW, STEP	
* 60	4-926-388-01	BRACKET (ADJUSTMENT)	
61	1-590-849-11	WIRE, FLAT TYPE (5 CORE)	
M701	A-4604-849-A	MOTOR ASSY, ROTARY (TABLE)	

5-3. CHASSIS ASSEMBLY



Ref.No.	Part No.	Description	Remark
101	1-535-892-11	JUMPER, FILM (WITH TERMINAL)	
102	4-933-134-01	SCREW (+PTPWH M2.6X6)	
103	4-949-385-11	SPRING (D), COIL	
* 104	4-934-373-01	BRACKET (BU)	
105	4-937-911-01	SPRING, TENSION	
106	4-917-519-11	LEVER, SET	
107	4-924-412-01	SPRING (B), TENSION	
* 108	4-951-619-01	CUSHION (A)	
* 109	1-639-288-11	LOADING MOTOR BOARD	
110	4-934-375-01	GEAR (LOADING B)	
111	4-934-381-01	GEAR (LOADING C)	
112	4-934-391-01	GEAR (LOADING A)	
113	4-926-317-01	SCREW, STEP	
114	X-4941-529-1	PULLEY ASSY	
115	4-944-490-01	BELT (TIMING)	
* 116	1-638-731-11	OPEN/UP SW BOARD	
* 117	A-4649-177-A	MAIN BOARD, COMPLETE	
* 118	4-943-997-01	CHASSIS	
* 119	4-943-996-01	SPRING, LEAF	
* 120	4-944-632-31	PANEL, BACK	
M702	A-4604-847-A	MOTOR ASSY, LOADING	
S701	1-572-713-11	SWITCH, PUSH (WITH CONNECTOR) (DOWN)	

5-4. OPTICAL PICK-UP BLOCK ASSEMBLY (BU-5BD3/M)



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No.	Part No.	Description	Remark
⚠151	8-848-144-11	DEVICE, OPTICAL KSS-240A	
152	1-575-001-11	WIRE, FLAT TYPE (12 CORE)	
153	4-917-567-01	GEAR (M)	
154	4-933-126-01	INSULATOR (A)	
155	4-917-565-01	SHAFT, SLED	
156	4-917-564-01	GEAR (P), FLATNESS	
157	A-4617-908-A	BD BOARD, COMPLETE	
M101	X-4917-504-1	MOTOR ASSY (SLED)	
M102	X-4917-523-3	BASE (OUTSERT) ASSY (SPINDLE MOTOR)	
S101	1-572-085-11	SWITCH, LEAF (LIMIT IN)	

SECTION 6
ELECTRICAL PARTS LIST

BD

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- Color Indication of Appearance Parts Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ Parts color ↑ Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: μ , for example:
  uA...: μA..., uPA...: μPA...,
  uPB...: μPB..., uPC...: μPC...,
  uPD...: μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH
- Canadian model is abbreviated as CND, and also Mexican model is MX.

Ref. No.	Part No.	Description			Remark
*	A-4617-908-A	BD BOARD, COMPLETE			
		**********			
		〈 CAPACITOR 〉			
C101	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C102	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C103	1-126-163-11	ELECT	4.7uF	20%	50V
C104	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C105	1-126-154-11	ELECT	47uF	20%	6.3V
C106	1-126-154-11	ELECT	47uF	20%	6.3V
C107	1-126-154-11	ELECT	47uF	20%	6.3V
C108	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C109	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C110	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C111	1-131-367-00	TANTALUM	22uF	10%	20V
C112	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C113	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C114	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C115	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C117	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C118	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C119	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C120	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C151	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C152	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C153	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C154	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C155	1-163-023-00	CERAMIC CHIP	0.015uF	5%	50V
C171	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C172	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C173	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C174	1-163-038-00	CERAMIC CHIP	0.1uF		25V
		〈 CONNECTOR 〉			
CN101	1-568-796-11	SOCKET, CONNECTOR 22P			
CN102	1-568-795-11	SOCKET, CONNECTOR 12P			
		〈 IC 〉			
IC101	8-752-053-73	IC CXA1372AQ			
IC102	8-759-822-36	IC LA6532M			
		〈 JACK 〉			
J101	1-216-295-00	METAL CHIP	0	5%	1/10W
J102	1-216-295-00	METAL CHIP	0	5%	1/10W
		〈 TRANSISTOR 〉			
Q101	8-729-901-01	TRANSISTOR DTC144EK			
		〈 RESISTOR 〉			
R101	1-216-097-00	METAL CHIP	100K	5%	1/10W
R102	1-216-095-00	METAL CHIP	82K	5%	1/10W
R103	1-216-091-00	METAL CHIP	56K	5%	1/10W
R104	1-216-099-00	METAL CHIP	120K	5%	1/10W
R105	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R106	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R107	1-216-114-00	METAL GLAZE	510K	5%	1/10W
R108	1-216-105-00	METAL CHIP	220K	5%	1/10W
R109	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R110	1-216-049-00	METAL CHIP	1K	5%	1/10W
R111	1-216-049-00	METAL CHIP	1K	5%	1/10W
R112	1-216-083-00	METAL CHIP	27K	5%	1/10W
R113	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R114	1-216-105-00	METAL CHIP	220K	5%	1/10W
R152	1-216-073-00	METAL CHIP	10K	5%	1/10W
R153	1-216-085-00	METAL CHIP	33K	5%	1/10W
R154	1-216-085-00	METAL CHIP	33K	5%	1/10W
R155	1-216-093-00	METAL CHIP	68K	5%	1/10W
R156	1-216-081-00	METAL CHIP	22K	5%	1/10W
R157	1-216-079-00	METAL CHIP	18K	5%	1/10W
R158	1-216-079-00	METAL CHIP	18K	5%	1/10W
R159	1-216-079-00	METAL CHIP	18K	5%	1/10W
R160	1-216-049-00	METAL CHIP	1K	5%	1/10W
R171	1-216-001-00	METAL CHIP	10	5%	1/10W
R172	1-216-001-00	METAL CHIP	10	5%	1/10W
R173	1-216-001-00	METAL CHIP	10	5%	1/10W
R174	1-216-001-00	METAL CHIP	10	5%	1/10W

BD MAIN DISPLAY RECEIVE

Ref. No.	Part No.	Description			Remark
		〈 VARIABLE RESISTOR 〉			
RV101	1-238-016-11	RES, ADJ, CARBON 10K			
RV102	1-238-016-11	RES, ADJ, CARBON 10K			
		〈 SWITCH 〉			
S101	1-572-085-11	SWITCH, LEAF (LIMIT)			
**********					
*	A-4649-177-A	MAIN BOARD, COMPLETE			
		**********			
*	A-4649-175-A	DISPLAY BOARD, COMPLETE			
		**********			
*	1-642-720-11	RECEIVE BOARD			
		**********			
*	4-875-327-01	HEAT SINK			
	7-682-547-04	SCREW +BVTT 3X6 (S)			
		〈 CAPACITOR 〉			
C204	1-124-556-11	ELECT	2200uF	20%	16V
C205	1-124-927-11	ELECT	4.7uF	20%	100V
C206	1-124-907-11	ELECT	10uF	20%	50V
C207	1-124-907-11	ELECT	10uF	20%	50V
C208	1-124-472-11	ELECT	470uF	20%	10V
C209	1-124-472-11	ELECT	470uF	20%	10V
C210	1-126-176-11	ELECT	220uF	20%	10V
C211	1-124-471-00	ELECT	1000uF	20%	6.3V
C213	1-164-159-11	CERAMIC	0.1uF		50V
C301	1-124-477-11	ELECT	47uF	20%	25V
C302	1-164-159-11	CERAMIC	0.1uF		50V
C303	1-164-159-11	CERAMIC	0.1uF		50V
C304	1-164-159-11	CERAMIC	0.1uF		50V
C311	1-136-161-00	FILM	0.047uF	5%	50V
C312	1-161-374-11	CERAMIC	0.0015uF	20%	50V
C313	1-161-494-00	CERAMIC	0.022uF		25V
C314	1-162-306-11	CERAMIC	0.01uF	20%	16V
C315	1-124-902-00	ELECT	0.47uF	20%	50V
C316	1-161-494-00	CERAMIC	0.022uF		25V
C320	1-164-159-11	CERAMIC	0.1uF		50V
C321	1-164-159-11	CERAMIC	0.1uF		50V
C331	1-162-208-31	CERAMIC	24PF	5%	50V
C336	1-124-477-11	ELECT	47uF	20%	25V
C342	1-124-477-11	ELECT	47uF	20%	25V
C343	1-164-159-11	CERAMIC	0.1uF		50V
C349	1-164-159-11	CERAMIC	0.1uF		50V
C350	1-124-477-11	ELECT	47uF	20%	25V
C351	1-161-494-00	CERAMIC	0.022uF		25V
C353	1-162-196-31	CERAMIC	5.6PF	10%	50V
C354	1-162-196-31	CERAMIC	5.6PF	10%	50V
C355	1-164-159-11	CERAMIC	0.1uF		50V
C356	1-124-477-11	ELECT	47uF	20%	25V
C357	1-161-772-11	CERAMIC	0.1uF	10%	25V
C362	1-162-280-31	CERAMIC	82PF	10%	50V
C363	1-162-213-31	CERAMIC	39PF	5%	50V
C364	1-162-213-31	CERAMIC	39PF	5%	50V
C365	1-162-213-31	CERAMIC	39PF	5%	50V
C366	1-162-213-31	CERAMIC	39PF	5%	50V
C367	1-162-280-31	CERAMIC	82PF	10%	50V
C371	1-130-479-00	MYLAR	0.0047uF	5%	50V
C372	1-130-479-00	MYLAR	0.0047uF	5%	50V
C373	1-130-472-00	MYLAR	0.0012uF	5%	50V
C374	1-130-472-00	MYLAR	0.0012uF	5%	50V
C375	1-126-176-11	ELECT	220uF	20%	10V
C376	1-126-176-11	ELECT	220uF	20%	10V
C377	1-124-477-11	ELECT	47uF	20%	25V
C378	1-124-477-11	ELECT	47uF	20%	25V
C380	1-123-382-00	ELECT	3.3uF	20%	100V
C381	1-123-382-00	ELECT	3.3uF	20%	100V
C382	1-124-122-11	ELECT	100uF	20%	50V
C383	1-124-927-11	ELECT	4.7uF	20%	100V
C401	1-124-477-11	ELECT	47uF	20%	25V
C402	1-164-159-11	CERAMIC	0.1uF		50V
C403	1-126-101-11	ELECT	100uF	20%	16V
C404	1-126-101-11	ELECT	100uF	20%	16V
C408	1-164-159-11	CERAMIC	0.1uF		50V
C409	1-164-159-11	CERAMIC	0.1uF		50V
C414	1-164-159-11	CERAMIC	0.1uF		50V
C425	1-162-294-31	CERAMIC	0.001uF	10%	50V
C426	1-162-294-31	CERAMIC	0.001uF	10%	50V
C427	1-162-294-31	CERAMIC	0.001uF	10%	50V
C428	1-162-294-31	CERAMIC	0.001uF	10%	50V
C429	1-162-294-31	CERAMIC	0.001uF	10%	50V

MAIN **DISPLAY** **RECEIVE**

Ref.No.	Part No.	Description			Remark
C430	1-162-294-31	CERAMIC	0.001uF	10%	50V
C431	1-162-294-31	CERAMIC	0.001uF	10%	50V
C432	1-162-294-31	CERAMIC	0.001uF	10%	50V
C440	1-124-907-11	ELECT	10uF	20%	50V
C441	1-124-907-11	ELECT	10uF	20%	50V
C442	1-126-233-11	ELECT	22uF	20%	50V
C551	1-161-494-00	CERAMIC	0.022uF		25V
		〈 CONNECTOR 〉			
* CN301	1-573-046-11	SOCKET, CONNECTOR 18P			
* CN401	1-573-080-11	SOCKET, CONNECTOR (34P, L TYPE)			
* CN402	1-568-943-11	PIN, CONNECTOR 5P			
* CN403	1-568-824-11	SOCKET, CONNECTOR 5P			
* CN404	1-568-943-11	PIN, CONNECTOR 5P			
CN408	1-691-637-11	PIN, CONNECTOR 9P			
* CN501	1-573-080-11	SOCKET, CONNECTOR (34P, L TYPE)			
		〈 DIODE 〉			
D208	8-719-109-89	DIODE	RD5.6ES-B2		
D209	8-719-987-63	DIODE	1N4148M		
D351	8-719-987-63	DIODE	1N4148M		
		〈 FILTER 〉			
FL501	1-519-655-11	FLUORESCENT INDICATOR			
		〈 IC 〉			
IC202	8-759-630-21	IC	M5290P-16		
IC204	8-759-604-86	IC	M5F7807		
IC301	8-752-337-26	IC	CXD2500AQ		
IC302	8-752-342-65	IC	CXD2560M		
IC303	8-752-349-01	IC	CXD2561AM		
IC306	8-759-503-91	IC	TL082ACP		
IC307	8-759-945-58	IC	RC4558P		
IC401	8-752-836-23	IC	CXP50116-279Q		
IC402	8-759-821-32	IC	CXA1291P		
IC551	8-749-920-83	IC	GP1U52XB		
		〈 JACK 〉			
J381	1-569-442-11	JACK, PIN 2P (LINE OUT)			

Ref.No.	Part No.	Description				Remark
		〈 COIL 〉				
L331	1-408-403-00	INDUCTOR	3.3uH			
L332	1-412-473-21	INDUCTOR	0uH			
L334	1-410-521-11	INDUCTOR	100uH			
L335	1-410-336-11	INDUCTOR	220uH			
L336	1-410-521-11	INDUCTOR	100uH			
L337	1-410-521-11	INDUCTOR	100uH			
L338	1-408-080-00	INDUCTOR	100uH			
L339	1-408-080-00	INDUCTOR	100uH			
		〈 TRANSISTOR 〉				
Q202	8-729-119-78	TRANSISTOR	2SC2785-HFE			
Q203	8-729-141-83	TRANSISTOR	2SB1094-LK			
Q204	8-729-900-61	TRANSISTOR	DTA114ES			
Q205	8-729-900-89	TRANSISTOR	DTC144ES			
Q206	8-729-900-89	TRANSISTOR	DTC144ES			
Q210	8-729-900-61	TRANSISTOR	DTA114ES			
Q211	8-729-900-80	TRANSISTOR	DTC114ES			
Q341	8-729-900-65	TRANSISTOR	DTA144ES			
Q342	8-729-900-65	TRANSISTOR	DTA144ES			
Q343	8-729-900-65	TRANSISTOR	DTA144ES			
Q344	8-729-900-89	TRANSISTOR	DTC144ES			
Q373	8-729-141-30	TRANSISTOR	2SC3623A-LK			
Q374	8-729-141-30	TRANSISTOR	2SC3623A-LK			
Q375	8-729-119-78	TRANSISTOR	2SC2785-HFE			
Q376	8-729-119-78	TRANSISTOR	2SC2785-HFE			
Q401	8-729-900-89	TRANSISTOR	DTC144ES			
		〈 RESISTOR 〉				
R204	1-249-425-11	CARBON	4.7K	5%	1/4W	
R205	1-249-425-11	CARBON	4.7K	5%	1/4W	
R208	1-249-423-11	CARBON	3.3K	5%	1/4W	
R209	1-249-413-11	CARBON	470	5%	1/4W	
R301	1-249-417-11	CARBON	1K	5%	1/4W	
R302	1-249-417-11	CARBON	1K	5%	1/4W	
R303	1-249-417-11	CARBON	1K	5%	1/4W	
R311	1-249-423-11	CARBON	3.3K	5%	1/4W	
R312	1-249-429-11	CARBON	10K	5%	1/4W	
R313	1-249-423-11	CARBON	3.3K	5%	1/4W	
R314	1-249-429-11	CARBON	10K	5%	1/4W	
R315	1-249-417-11	CARBON	1K	5%	1/4W	

MAIN DISPLAY RECEIVE

Ref. No.	Part No.	Description				Remark
R316	1-249-417-11	CARBON	1K	5%	1/4W	
R317	1-249-420-11	CARBON	1.8K	5%	1/4W	
R318	1-249-441-11	CARBON	100K	5%	1/4W	
R321	1-249-417-11	CARBON	1K	5%	1/4W	
R322	1-249-417-11	CARBON	1K	5%	1/4W	
R323	1-249-417-11	CARBON	1K	5%	1/4W	
R324	1-249-417-11	CARBON	1K	5%	1/4W	
R330	1-249-417-11	CARBON	1K	5%	1/4W	
R331	1-249-417-11	CARBON	1K	5%	1/4W	
R342	1-249-417-11	CARBON	1K	5%	1/4W	
R343	1-249-441-11	CARBON	100K	5%	1/4W	
R344	1-249-441-11	CARBON	100K	5%	1/4W	
R345	1-249-425-11	CARBON	4.7K	5%	1/4W	
R346	1-249-425-11	CARBON	4.7K	5%	1/4W	
R347	1-249-441-11	CARBON	100K	5%	1/4W	
R348	1-249-429-11	CARBON	10K	5%	1/4W	
R351	1-249-436-11	CARBON	39K	5%	1/4W	
R352	1-249-436-11	CARBON	39K	5%	1/4W	
R353	1-249-436-11	CARBON	39K	5%	1/4W	
R354	1-249-436-11	CARBON	39K	5%	1/4W	
R355	1-249-436-11	CARBON	39K	5%	1/4W	
R356	1-249-436-11	CARBON	39K	5%	1/4W	
R357	1-249-436-11	CARBON	39K	5%	1/4W	
R358	1-249-436-11	CARBON	39K	5%	1/4W	
R359	1-247-903-00	CARBON	1M	5%	1/4W	
R361	1-249-432-11	CARBON	18K	5%	1/4W	
R362	1-249-432-11	CARBON	18K	5%	1/4W	
R363	1-249-432-11	CARBON	18K	5%	1/4W	
R364	1-249-432-11	CARBON	18K	5%	1/4W	
R365	1-249-438-11	CARBON	56K	5%	1/4W	
R366	1-249-438-11	CARBON	56K	5%	1/4W	
R367	1-249-438-11	CARBON	56K	5%	1/4W	
R368	1-249-438-11	CARBON	56K	5%	1/4W	
R369	1-249-419-11	CARBON	1.5K	5%	1/4W	
R370	1-249-419-11	CARBON	1.5K	5%	1/4W	
R371	1-249-419-11	CARBON	1.5K	5%	1/4W	
R372	1-249-419-11	CARBON	1.5K	5%	1/4W	
R373	1-247-887-00	CARBON	220K	5%	1/4W	
R374	1-247-887-00	CARBON	220K	5%	1/4W	
R375	1-249-426-11	CARBON	5.6K	5%	1/4W	
R376	1-249-426-11	CARBON	5.6K	5%	1/4W	
R377	1-247-862-11	CARBON	20K	5%	1/4W	
R378	1-247-862-11	CARBON	20K	5%	1/4W	
R381	1-249-425-11	CARBON	4.7K	5%	1/4W	
R382	1-249-425-11	CARBON	4.7K	5%	1/4W	
R401	1-249-433-11	CARBON	22K	5%	1/4W	
R402	1-249-433-11	CARBON	22K	5%	1/4W	
R403	1-249-433-11	CARBON	22K	5%	1/4W	
R404	1-249-425-11	CARBON	4.7K	5%	1/4W	
R405	1-249-425-11	CARBON	4.7K	5%	1/4W	
R406	1-249-425-11	CARBON	4.7K	5%	1/4W	
R407	1-249-433-11	CARBON	22K	5%	1/4W	
R408	1-249-441-11	CARBON	100K	5%	1/4W	
R409	1-247-864-11	CARBON	24K	5%	1/4W	
R410	1-247-880-11	CARBON	110K	5%	1/4W	
R411	1-249-440-11	CARBON	82K	5%	1/4W	
R412	1-247-876-11	CARBON	75K	5%	1/4W	
R413	1-249-440-11	CARBON	82K	5%	1/4W	
R414	1-247-874-11	CARBON	62K	5%	1/4W	
R415	1-249-435-11	CARBON	33K	5%	1/4W	
R416	1-247-878-00	CARBON	91K	5%	1/4W	
R421	1-249-393-11	CARBON	10	5%	1/4W	
R422	1-249-393-11	CARBON	10	5%	1/4W	
R425	1-249-429-11	CARBON	10K	5%	1/4W	
R426	1-249-429-11	CARBON	10K	5%	1/4W	
R427	1-249-429-11	CARBON	10K	5%	1/4W	
R428	1-249-429-11	CARBON	10K	5%	1/4W	
R429	1-249-429-11	CARBON	10K	5%	1/4W	
R430	1-249-429-11	CARBON	10K	5%	1/4W	
R431	1-249-429-11	CARBON	10K	5%	1/4W	
R432	1-249-429-11	CARBON	10K	5%	1/4W	
R501	1-249-422-11	CARBON	2.7K	5%	1/4W	
R502	1-249-424-11	CARBON	3.9K	5%	1/4W	
R503	1-249-427-11	CARBON	6.8K	5%	1/4W	
R504	1-249-432-11	CARBON	18K	5%	1/4W	
R505	1-249-422-11	CARBON	2.7K	5%	1/4W	
R506	1-249-424-11	CARBON	3.9K	5%	1/4W	
R507	1-249-427-11	CARBON	6.8K	5%	1/4W	
R508	1-249-432-11	CARBON	18K	5%	1/4W	
R509	1-249-422-11	CARBON	2.7K	5%	1/4W	
R551	1-249-422-11	CARBON	2.7K	5%	1/4W	
R552	1-249-424-11	CARBON	3.9K	5%	1/4W	
R553	1-249-427-11	CARBON	6.8K	5%	1/4W	

MAIN | DISPLAY | RECEIVE

TABLE MOTOR | LOADING MOTOR | OPEN/UP SW

Ref. No.	Part No.	Description				Remark
R554	1-249-432-11	CARBON	18K	5%	1/4W	
R555	1-249-422-11	CARBON	2.7K	5%	1/4W	
R556	1-249-424-11	CARBON	3.9K	5%	1/4W	
R557	1-249-427-11	CARBON	6.8K	5%	1/4W	
		〈 SWITCH 〉				
S501	1-554-303-21	SWITCH, TACTILE (▶▶|)				
S502	1-554-303-21	SWITCH, TACTILE (|◀◀)				
S503	1-554-303-21	SWITCH, TACTILE (■)				
S504	1-554-303-21	SWITCH, TACTILE (OPEN/CLOSE)				
S505	1-554-303-21	SWITCH, TACTILE (DISC SKIP)				
S506	1-554-303-21	SWITCH, TACTILE (EDIT/TIME FADE)				
S507	1-554-303-21	SWITCH, TACTILE (▶▶)				
S508	1-554-303-21	SWITCH, TACTILE (◀◀)				
S509	1-554-303-21	SWITCH, TACTILE (▶)				
S510	1-554-303-21	SWITCH, TACTILE (▮▮)				
S511	1-554-303-21	SWITCH, TACTILE (TIME)				
S512	1-554-303-21	SWITCH, TACTILE (REPEAT)				
S551	1-554-303-21	SWITCH, TACTILE (DISC 1)				
S552	1-554-303-21	SWITCH, TACTILE (DISC 2)				
S553	1-554-303-21	SWITCH, TACTILE (DISC 3)				
S554	1-554-303-21	SWITCH, TACTILE (DISC 4)				
S555	1-554-303-21	SWITCH, TACTILE (DISC 5)				
S556	1-554-303-21	SWITCH, TACTILE (CONTINUE)				
S557	1-554-303-21	SWITCH, TACTILE (SHUFFLE)				
S558	1-554-303-21	SWITCH, TACTILE (PROGRAM)				
S559	1-554-303-21	SWITCH, TACTILE (PEAK SEARCH)				
		〈 CRYSTAL 〉				
X351	1-567-965-11	VIBRATOR, CRYSTAL (22.5MHz)				
**********						
	1-638-729-11	TABLE MOTOR BOARD				
		**********				
*	1-639-288-11	LOADING MOTOR BOARD				
		**********				
	1-638-731-11	OPEN/UP SW BOARD				
		**********				

Ref. No.	Part No.	Description				Remark
		〈 CAPACITOR 〉				
C705	1-161-375-00	CERAMIC	0.0022uF	20%	50V	
		〈 CONNECTOR 〉				
* CN705	1-566-214-11	PIN, CONNECTOR (PC BOARD) 2P				
* CN707	1-573-044-11	SOCKET, CONNECTOR 5P				
		〈 DIODE 〉				
D701	8-719-970-19	DIODE GP-1A521				
		〈 RESISTOR 〉				
R701	1-249-416-11	CARBON	820	5%	1/4W	
		〈 SWITCH 〉				
S702	1-571-300-21	SWITCH, ROTARY (OPEN/UP)				
**********						
		MISCELLANEOUS				
		**********				
4	1-590-835-11	WIRE, FLAT TYPE (34 CORE)				
* 54	1-452-538-11	MAGNET				
61	1-590-849-11	WIRE, FLAT TYPE (5 CORE)				
101	1-535-892-11	JUMPER, FILM (WITH TERMINAL)				
⚠151	8-848-144-11	DEVICE, OPTICAL KSS-240A				
152	1-575-001-11	WIRE, FLAT TYPE (12 CORE)				
M101	X-4917-504-1	MOTOR ASSY (SLED)				
M102	X-4917-523-3	BASE (OUTSERT) ASSY (SPINDLE MOTOR)				
M701	A-4604-849-A	MOTOR ASSY, ROTARY (TABLE)				
M702	A-4604-847-A	MOTOR ASSY, LOADING				
S701	1-572-713-11	SWITCH, PUSH (WITH CONNECTOR) (DOWN)				
**********						
		ACCESSORIES & PACKING MATERIALS				
		**********				
	4-937-945-01	PLATE (TRANSPORT), LOCK				
*	4-945-044-01	CUSHION (FRONT)				
*	4-945-045-01	CUSHION (LOWER)				
**********						

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
		HARDWARE LIST	
		************	
#1	7-685-647-79	SCREW +BVTP 3X10 TYPE2 N-S	
#2	7-682-548-04	SCREW +BVTT 3X8 (S)	
#3	7-621-255-15	SCREW +P 2X3	
#4	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
#5	7-682-554-04	SCREW +B 3X25	
#6	7-685-134-19	SCREW +BTP 2.6X8 TYPE2 N-S	
#7	7-685-136-19	SCREW +P 2.6X12 TYPE2 NON-SLIT	
#8	7-682-547-04	SCREW +BVTT 3X6 (S)	
#9	7-685-648-79	SCREW (M3X12), TAPPING	

9-956-958-11

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